REMARKS

This Amendment is being filed together with a Request for Continued Examination following a Notice of Appeal filed May 10, 2004.

Claims 1-32, 39, and 55 are pending. Claim 17 has been amended to be in independent form. Claim 27 has been amended to be in independent form including the limitations of claim 29 and intervening claim 28. Claim 55 is a new independent claim, which like method claim 17, recites two reference surfaces.

The actions indicates that the subject matter of dependent claims 17-26 and 29 would be allowable if rewritten in independent form. Accordingly, we submit that independent claims 17 and 27, and any claims that depend from them are allowable. Similarly, we submit that new indpendent claim 55 is allowable, because like method claim 17, it recites two reference surfaces.

The only remaining independent claims are claims 1 and 39, which stand rejected as obvious over Groot (U.S. 6,359,692) in view of Suematsu (Applied Optics 30:4046-4055, 1991). The rejection is based on "applying the analysis of Suematsu <u>at each spatial location</u> of the interferometry data of Groot" (see page 10 of action dated February 3, 2003). We traverse.

There is no dispute that the Suematsu discloses determining the phase of the fringe signal, $\phi(t) = 2\pi f_s t + \theta(t) + \phi_0$, from Eq. 15. In our prior response, we argued that this fringe signal phase is not the phase of the frequency transform recited in the claims (e.g., see pages 8-9 of our Reply filed November 21, 2003). In the present action, the Examiner seems to agree, but goes on to explain that determining the fringe signal $\phi(t)$ implicitly extracts the phase of the frequency transform because $\phi(t=0) = \phi_0$ (page 9 of action).

Accordingly, we have amended claims 1 and 39 to more accurately distinguish Suematsu so that the claims not only require extracting phases of the frequency transform, but also using those extracted phases to determine useful information. More specifically, claim 1 now recites "... for each location, calculating a frequency transform of the interference signal at a frequency corresponding to each of selected pairs of the different surfaces in the set of cavity surfaces and

extracting the phase of the frequency transform at each of the frequencies corresponding to the selected pairs of surfaces; and determining at least one of i) a surface profile of at least one of the test object surfaces and ii) a relative optical thickness profile between two of the test object surfaces, *based on at least some of the extracted phases*" (emphasis added). Claim 39 recites that during operation the claimed electronic processor performs these same steps.

While Suematsu may disclose a technique that extracts a phase of the frequency transform because $\phi(t=0)=\phi_0$, it is clear that he does not use this information in any way. To the contrary, Suematsu disregards the phase ϕ_0, and teaches computing the optical path difference L from the time-dependent part, e.g., the frequency f_s, of the fringe signal $\phi(t)$. For example, Suematsu states:

> From Eq. (3) we see that the linear wavelength shift produces a constant carrier frequency f_s, which is proportional to the optical path difference L. Thus we can obtain L by determining the carrier frequency f_s, for example, by counting the number of fringes or by computing the position of the spectrum peak. (Suematsu at page 4047, right column).
>
> The principle of the OFDR is to determine f_s from the peak position of the spectrum $C(f-f_s)$ and compute L from Eq. (9). (Suematsu at page 4048, right column).

Moreover, Suematsu suggests that an even better way to compute the optical path difference L is to further apply a reference technique to the fringe signal $\phi(t)$ to account for nonlinear effects such as freqency chirping. See, for example, the Abstract of Suematsu at page 4046, as well as page 4047, right column, page 4048, right column, and page 4049, left column. When using this reference technique, Suematsu explicitly "eliminates" the phase ϕ_0.

> To <u>eliminate</u> the unknown constant phases ϕ_0 and ϕ_{R0}, we differentiate the phases and obtain instantaneous angular frequencies" (Suematsu at page 4049, left column, emphasis added).

Taken as a whole, there can be no reasonable dispute that Suematsu teaches calculating the optical path difference L based on the time-dependent part of the fringe signal, and ignoring

the phase ϕ_0. Thus, even if the analysis of Suematsu was applied to each spatial location of the interferometry data of Groot, as proposed by the rejection, the resulting combination would not "determin[e] at least one of i) a surface profile of at least one of the test object surfaces and ii) a relative optical thickness profile between two of the test object surfaces, *based on at least some of the extracted phases*," as recited in claim 1 and similarly recited in claim 39 (emphasis added). To the contrary, Suematsu teaches disregarding any such extracted phase.

In view of the above, we ask that the rejection be withdrawn and that the application be allowed.

As noted above, this Amendment is being filed together with a Request for Continued Examination following a Notice of Appeal filed May 10, 2004. Enclosed is a $980.00 check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050, referencing Attorney Docket No. 09712-116001.

Respectfully submitted,

Date: 10/7/04

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***See attached document certifying that Marc M. Wefers has limited recognition to practice before the U.S. Patent and Trademark Office under 37 C.F.R. § 10.9(b).**

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